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COMPLETE SPECIFICATION.

Improvements relating to Dynamo-Rotary Pump Combinations.

We, SIMMS MOTOR UNITS LIMITED, a British Company, of Oak Lane, East Finchley, London, N.2, and GEORGE JOHN RACKHAM, a British Subject, of the Company's address, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to rotary pumps driven by the engine of an internal combustion engine power installation, for example such an installation forming the propulsion unit of a diesel engine motor vehicle, the installation including a lighting dynamo, also driven by the engine. The rotary pump may be either an exhauster (vacuum) pump as in the case, for example, of a vacuum servo-braking system, or a pressure pump, e.g. an air compressor or an oil pump.

It is established common practice with diesel engine motor vehicles to fit a small vacuum pump driven from the engine for the purpose of operating a vacuum servo-braking system.

These vacuum pumps are usually of the rotary blade type driven through a train of gears from the engine crank shaft and for convenience are always in tandem drive with the fuel injection pump, which necessarily runs at half engine speed.

In order to give the required displacement volume this vacuum pump is somewhat large and cumbersome, as it runs at only half engine speed. It is also expensive.

The usual design of vacuum pump is a self-contained unit driven through its own couplings or cardan shaft, special mounting brackets being provided for it on the engine.

It is also known to provide a dynamo-pump unit comprising in combination with the dynamo a rotary pump of the gear type, the pump being driven directly by the spindle of the dynamo through a detachable coupling. It is further known to provide a dynamo-pump unit comprising in combination with the dynamo a rotary pump of the sliding vane type driven directly by the dynamo, the rotor of the pump being an extension of the spindle of the dynamo.

According to the present invention, there is provided in or for an internal combustion engine (e.g. diesel engine) power installation incorporating a lighting dynamo driven by the engine of the installation and a rotary exhauster (vacuum) pump or pressure pump also driven by the said engine, such a dynamo-pump combination consisting of a dynamo driven by the engine and a rotary pump also driven by the said engine, wherein the dynamo and the pump are combined to form a single composite unit having a common mounting, wherein the pump is a sliding-vane type pump constructed as a self-contained entity, having its own casing end walls and rotor bearings independent of the casing end walls and spindle bearings of the dynamo, and being located at one end of the dynamo with its rotor coaxial with the dynamo spindle and drivingly coupled thereto solely through the intermediary of a disconnectable coupling housed within a space intervening for its accommodation between the mutually adjacent end walls of the dynamo and pump casings, wherein the casing of the pump is detachably connected to the casing of the dynamo and wherein the pump is supported entirely by the dynamo.

With a lighting dynamo-pump combination in accordance with the present invention considerable economics in weight and production costs are achievable, as compared with the arrangement usually employed, according to which, in the case of a vacuum pump for a servo-motor system, driven by the engine of a diesel engine power installation, the pump is driven in tandem with the

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fuel injection pump of the engine and is an entirely self-contained unit having its own couplings or carden shaft and its own mounting brackets, in that (*a*) the pump, which will usually run at approximately one and a half to twice the speed of the engine (this being the usual speed of the lighting dynamo) as compared with only half the engine speed, can be very much smaller, its necessary size being of course in inverse proportion to its greater speed of rotation, and (*b*) the need for a separate mounting for the pump and also for a coupling or cardan shaft for the drive of the pump are eliminated.

The invention will now be further described by way of example with reference to the accompanying drawing, which is a side elevational view, partly in section, of the lighting dynamo-pump combination of the invention.

The form of the invention illustrated may be taken to represent, by way of example, an application of the invention to the exhauster and its driving means of a vacuum servo-braking system of a diesel engine motor vehicle. The combination shown comprises a lighting dynamo 1 and a rotary sliding-vane type exhauster 2, the spindle 3 of the dynamo being extended through the end plate 4 of the dynamo casing at the end thereof remote from the end at which the usual driving belt pulley (not shown) on the spindle is situated. The spindle 3 extends beyond said end plate 4 and where it so extends it is provided with a slot which accommodates one half of an Oldham coupling, the other half of which is accommodated in a second slot on a separate shaft 5 coaxial with the dynamo spindle, having its own end ball-bearings 6, 7 and carrying a sleeve 8, said shaft 5 and sleeve 8 forming together the rotor of the exhauster. It will be seen, therefore, that the exhauster is arranged as an entirely separate entity from the dynamo, having its own detachable end walls, which are marked 9, 10, and rotor bearings independently of those of the dynamo.

The exhauster is driven by the dynamo, through the intermediary of the Oldham coupling and it is detachably mounted upon the end plate 4 of the dynamo casing, the coupling being housed within a space 11 intervening for its accommmodation between the mutually adjacent end plates 4 and 9 of the dynamo and exhauster casings.

The dynamo spindle has two end bearings, one (not shown) carried in the left hand end plate of the dynamo casing and the other marked 12, carried in the end plate 4 of the dynamo casing.

A seal 13 is provided to seal with adequate tightness the opening in the end plate 4 through which the dynamo spindle extends into the space 11 of the exhauster. A similar seal 14 is provided to seal off the interior space of the exhauster from the space 11.

The pump element (exhauster) of the combination is supported entirely by the dynamo element, through the intermediary of a flange 15 projecting rearwardly from the end wall 9 of the exhauster casing, said flange 15 providing the lateral boundaries of the space 11 aforesaid.

Although the usually preferred arrangement is one in which, as in the particular arrangement aforesaid, the vacuum pump is driven through the dynamo spindle, the reverse arrangement may, if desired, be employed.

What we claim is:—

1. In or for an internal combustion engine (e.g. diesel engine) power installation incorporating a lighting dynamo driven by the engine of the installation and a rotary exhauster (vacuum) pump or pressure pump (e.g. an air compressor or oil pump) also driven by the said engine, such a dynamo-pump combination consisting of a dynamo driven by the engine and a rotary pump also driven by the said engine, wherein the dynamo and the pump are combined to form a single composite unit having a common mounting, wherein the pump is a sliding-vane type pump constructed as a self-contained entity, having its own casing end walls and rotor bearings independent of the casing end walls and spindle bearings of the dynamo, and being located at one end of the dynamo with its rotor coaxial with the dynamo spindle and drivingly coupled thereto solely through the intermediary of a disconnectable coupling housed within a space intervening for its accommodation between the mutually adjacent end walls of the dynamo and pump casings, wherein the casing of the pump is detachably connected to the casing of the dynamo and wherein the pump is supported entirely by the dynamo.

2. A lighting dynamo-pump combination according to Claim 1 in which the disconnectable coupling is an Oldham coupling.

3. A lighting dynamo-pump combination according to Claim 1 or Claim 2 in which the rotor bearings of the pump are in the form of ball-bearings.

4. A lighting dynamo-pump combination according to any of the preceding claims in which the two end walls of the pump are each detachable from the body of the pump.

5. A motor vehicle incorporating a lighting dynamo-pump combination according to any of the preceding claims and having a vacuum-operated servo-braking system, in which the pump serves as the source of vacuum for said system.

6. A motor vehicle according to Claim 5 in which the vehicle has a diesel engine and in which the combination is driven at a

speed which is approximately one and a half to twice that of the crankshaft of the diesel engine.

7. A lighting dynamo-pump combination constructed, arranged and adapted for use substantially as herein described and as illustrated in the accompanying drawing.

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PROVISIONAL SPECIFICATION.

Improvements relating to Dynamo-Rotary Pump Combinations.

We, SIMMS MOTOR UNITS LIMITED, a British Company, of Oak Lane, East Finchley, London, N.2, and GEORGE JOHN RACKHAM, a British Subject, of the Company's address, do hereby declare this invention to be described in the following statement:—

This invention relates to servo-motor and like rotary pumps driven by the engine of an internal combustion engine power installation, for example such an installation forming the propulsion unit of a diesel engine motor vehicle, the installation including a dynamo, e.g. a lighting dynamo, also driven by the engine. The rotary pump may be either an exhauster (vacuum) pump, as in the case, for example, of a vacuum servo braking system, or a pressure pump, e.g. an air compressor or an old pump.

It is established common practice with diesel engined motor vehicles to fit a small vacuum pump driven from the engine for the purpose of operating a vacuum servo braking system.

These vacuum pumps are usually of the rotary blade type driven through a train of gears from the engine crankshaft and for convenience are always in tandem drive with the fuel injection pump, which necessarily runs at half engine speed.

In order to give the required displacement volume this vacuum pump is somewhat large and cumbersome, as it runs at only half engine speed. It is also expensive.

The usual design of vacuum pump is a self-contained unit driven through its own couplings or cardan shaft, special mounting brackets being provided for it on the engine.

According to the invention, a rotary pump, e.g. a servo-motor vacuum pump, driven by the engine of an internal combustion engine power installation including a dynamo, e.g. a lighting dynamo, also driven by the engine, is a self-contained unit mounted upon the dynamo at one end thereof with its rotor coupled to the dynamo spindle, e.g. through a disconnectable coupling, for rotation as one therewith.

With such an arrangement considerable economies in weight and production costs are achievable, as compared with the usual arrangement visualised above, where, in the case of a servo-motor vacuum pump driven by the engine of a diesel engine power installation, the pump is driven in tandem with the fuel injection pump of the engine, having its own couplings and cardan shaft and its own mounting brackets, in that (*a*) the pump, which will usually run at approximately one and a half to twice the speed of the engine as compared with only half the engine speed, can be very much smaller, its necessary size being of course in inverse proportion to its greater speed of rotation, and (*b*) the need for a separate mounting for the pump and also for a coupling or cardan shaft for the drive of the pump are eliminated.

According to one generally preferred form of the invention, as applied by way of example to the exhauster element (vacuum pump) of a vacuum servo braking system of a diesel engined motor vehicle, the construction is as follows:—

The spindle of the lighting dynamo is extended through the end plate of the dynamo casing at the end thereof remote from the end at which the usual driving belt pulley on the spindle is situated, to carry one half of a disconnectable coupling as above referred to, the other half of which is carried upon a shaft fast with the rotor of the vacuum pump to be driven in unison with the dynamo, the said pump being constructed as an entirely separate entity from the dynamo, to be driven thereby through the intermediary of the coupling, and being mounted upon the aforesaid end plate of the dynamo casing through the intermediary of a pair of lugs. These lugs are bolted to the said end plate of the dynamo on the one hand and to the pump casing on the other and they space the pump a short distance from the dynamo, the disconnectable coupling being situated within the space between these parts.

The pump may be of any desired construction. Thus it may be of the rotary blade type hereinbefore referred to or of any other type suitable for the purposes of the installation.

Although the usually preferred arrangement is one in which, as in the arrangement described above, the pump is driven through the dynamo spindle, the reverse arrangement may, if desired, be employed.

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1 SHEET

This drawing is a reproduction of the Original on a reduced scale.